REMARKS

Claims 1-10 and 21-30 have previously been withdrawn.
Independent claim 11 is currently amended. This amendment is
supported in the specification, for example at paragraph 0043.
In addition, paragraph 0038 of the specification has been
amended to correct a typographical error. No new matter has
been added. For the reasons described below, Applicants
respectfully request that claims 11-20 (as amended) be allowed.

Rejections under 35 U.S.C. § 102(e)

Claims 11-20 were rejected under 35 U.S.C. § 102(e) as
allegedly anticipated by U.S. Patent No. 6,794,096 to Kroyan
("Kroyan"). Kroyan discloses that a phase shifting mask layout
can result in a non-uniform transmission of light through
complementary shifters. [Kroyan at col. 1, ll. 49-51.] Such an
imbalance can cause a shift in feature location. [*Id.* at col.
2, ll. 7-8.] To correct this imbalance, Kroyan discloses
determining, for each shifter in a pair of shifters, a bias that
refers to a particular distance, N nm. [*Id.* at col. 4, ll. 55-
58.] The bias is used to <u>decrease</u> the initial width of the
first shifter in the pair by N nm. [*Id.* at col. 4, ll. 57-59.]
Similarly, the bias is used to <u>increase</u> the initial width of the
second shifter (which had been the same as the initial width of
the first shifter) in the pair by N nm. [*Id.* at col. 4, ll. 59-
61.]

The claims as amended differ from Kroyan for at least two
independent reasons.

First, Kroyan discloses a table of biases in which the
entries are computed as distances, not differences of
electromagnetic fields. As mentioned above, the bias in
Kroyan's bias table refers to a <u>distance</u>, denoted as N nm. [*Id.*
at col. 4, ll. 55-61).] Kroyan thus is different from the

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subject matter of claim 11 as amended, which requires "a library of corrections including a plurality of corrections . . . , wherein each correction of said plurality of corrections comprises a difference of a rigorous field and a fast field" (emphasis added). Because the biases in Kroyan's bias table refer to distances rather than differences of electromagnetic fields, Kroyan does not disclose or suggest the subject matter of independent claim 11 as amended. Claims 12-20 each depend from claim 11 and are allowable for at least this reason.

Second, Kroyan's table contains bias corrections for pairs of shifters, but no corrections for single edges. As described above, Kroyan "determin[es] a bias for each shifter in a pair of phase shifters." [Kroyan at col. 4, ll. 56-57 (emphasis added).] This single bias entry is then used to change the widths of each of the shifters in the pair. [Id. at 57-61.] Kroyan's table "correlates each original shifter pair size with an appropriate bias to correct for image intensity imbalance." [Id. at col. 10, ll. 15-17.] Kroyan thus is different from the subject matter of claim 11, which requires "a library of corrections including a plurality of corrections . . . including edge corrections . . ." (emphasis added). Because Kroyan's bias table does not include edge corrections, Kroyan does not disclose or suggest the subject matter of independent claim 11. Claims 12-20 each depend from claim 11 and are allowable for at least this reason.

Rejections under 35 U.S.C. § 103(a)

Claims 11-20 were also rejected as allegedly obvious under 35 U.S.C. § 103(a) over U.S. Patent Application Publication 2003/0074646 by Kotani, et al. ("Kotani") in view of Kroyan. The Office Action states that "[t]he teachings of Kotani et al. differ from those of the applicant in that the applicant teaches the use of the rigorous method for generating the corrections.

. . . It would have been obvious to one having ordinary skill in the art to take the teachings of Kotani et al. and combine them with the teachings of Kroyan in order to make the claimed invention because it would be obvious to one in the art to employ the more rigorous corrections of Kroyan in the library of Kotani et al. to produce a better product." [Office Action at 5.] In other words, the Office Action contends that Kotani discloses or suggests all the limitations of the present claims except generation of corrections using a rigorous method.

Kotani discloses cutting a mask into portions and generating corrections corresponding to the pattern of each cut portion. [*See* Kotani at ¶¶ 57-63.] A library contains correction values for edge coordinate groups, [*id.* at ¶ 0012], where each edge coordinate group is an assembly of coordinate positions of the edges of the pattern in the cut portion [*id.* at ¶ 0061].

For at least three independent reasons, claim 11 as amended is not disclosed or suggested by Kotani in view of Kroyan.

First, there is no indication in Kotani that the patterns under consideration are primitives such as edges, corners, or spaces. As mentioned above, Kotani discusses cutting up a mask into patterns of an undisclosed "certain size", [*id.* at ¶ 57], and it discloses a library containing corrections for such patterns. Kotani does not disclose, however, the nature of each pattern, and therefore it does not indicate the nature of the library entries corresponding to each pattern. Kotani thus is different from the subject matter of claim 11, which requires a library that includes "edge corrections and at least one of corner corrections, space corrections, shape corrections, and edge-to-edge corrections . . . ." For at least this reason, Kotani in view of Kroyan does not disclose or suggest the subject matter of claim 11. Claims 12-20 each depend from claim 11 and are allowable for at least this reason.

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Second, Kotani does not disclose a library in which the entries comprise a difference of a rigorous field and a fast field. Rather, Kotani states that "the correction value is calculated by the optical simulation, process simulation, and equations such as a polynomial equation representing the correction value." [*Id.* at ¶ 0016.] This is different from claim 11 as amended, which recites " a library of corrections including a plurality of corrections . . . , wherein each correction of said plurality of corrections comprises a difference of a rigorous field and a fast field" (emphasis added). Because it fails to disclose a library with corrections that comprise a difference of a rigorous field and a fast field, Kotani is different from the subject matter of claim 11 as amended. For at least this reason, Kotani in view of Kroyan does not disclose or suggest the subject matter of claim 11 as amended. Claims 12-20 each depend from claim 11 and are allowable for at least this reason.

Third, there is no motivation to combine Kotani and Kroyan as proposed in the Office Action. A motivation to combine references is a requirement for establishing a *prima facie* case of obviousness. MPEP § 2143. Applicants respectfully note that the Office Action does not identify any motivation to combine the references. Indeed, no such motivation exists for the combination proposed by the Examiner, because the proposed combination would impermissibly change an important operational principle of the alleged prior art. *See* MPEP § 2143.01(VI). The Office Action acknowledges that Kotani does not use a rigorous method to calculate the corrections for its pattern. [*See* Office Action at 5.] Use of a rigorous method to calculate corrections for Kotani's patterns--of undisclosed size and of undisclosed complexity--could result in a prohibitively long computation time. [*See* Application at ¶ 0018.] Kotani acknowledges that reduction of computation time is an important

principle of the disclosed techniques. [*See*, *e.g.*, Kotani at ¶¶ 18, 99, 100, 102, 106, 107, 110, 151, 154, 155; *see also id.* at Figure 9.] Therefore the Examiner's proposed combination is inconsistent with the teaching of, and thus is not supported by, Kotani. There is no motivation to combine the two references as proposed in the Office Action. For at least the above reason, the subject matter of claim 11 is not disclosed or suggested by Kotani in view of Kroyan. Claims 12-20 each depend from claim 11 and are allowable for at least this reason.
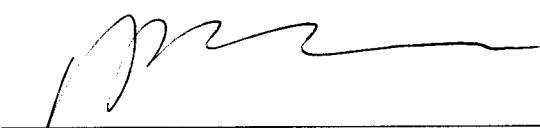
Conclusion

Applicants ask that claims 11-20 (as amended) be allowed.

Pursuant to 37 CFR §1.136, applicant hereby petitions that the period for response to the action dated October 13, 2006, be extended for three months to and including April 13, 2007.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: April 13, 2007

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